


WHAT IS CLAIMED IS:

1  A method of compensating for channel inversions
2 comprising:

3 determining the sign of a frame;

4 differentially encoding the sign of the frame;

differentially encoding the frame;

receiving the channel output;

determining the sign of the output; and

differentially decoding the output.

2 2. The method of Claim 1, wherein the sign is set to
zero if $R_0 \leq N/2$ and the sign is set to one if $R_0 > N/2$, where
3 R_0 is the frame value and N is the product of the moduli.

1 3. The method of Claim 1, wherein the sign is set to
2 zero if $R_0 < N/2$ and the sign is set to one if $R_0 \geq N/2$, where
3 R_0 is the frame value and N is the product of the moduli.

1 4. The method of Claim 1, wherein the sign is
2 differentially encoded using the equation:

3
$$d(n) = [s(n) + d(n-1)]_{\text{mod}2}.$$

1 5. The method of Claim 1, wherein the frame value is
2 differentially encoded using the equation:

$$3 \quad D(n) = [D(n-1) + N + (-1)^{d(n-1)} R_0]_{\text{mod } N}.$$

1 6. The method of Claim 1, wherein the output is
2 differentially decoded using the equation:

$$3 \quad R_0 = [N + (-1)^{r(n-1)} R(n)]_{\text{mod } N}.$$

1 7. The method of Claim 1, further comprising
2 translating the differentially encoded frame into symbols.

3 8. The method of Claim 1, wherein the sign of the frame
4 and the frame value are differentially decoding.

1 9. A method of compensating for a phase shift in a
2 modem comprising:

3 attributing a sign to a frame of constellation points;

4 differentially encoding the frame and the sign; and

5 differentially decoding the frame and the sign.

1 10. The method of Claim 9, wherein the sign is set to
2 zero if $R_0 \leq N/2$ and the sign is set to one if $R_0 > N/2$, where
3 R_0 is the frame value and N is the product of the moduli.

1 11. The method of Claim 9, wherein the sign is set to
2 zero if $R_0 < N/2$ and the sign is set to one if $R_0 \geq N/2$, where
3 R_0 is the frame value and N is the product of the moduli.

1 12. The method of Claim 9, wherein the differential
2 decoding is performed after a multiple modulus decoder.

1 13. The method of Claim 9, the frame is differentially
2 encoded before being supplied to a multiple modulus encoder.

1 14. A method of compensating for a phase shift in a
2 modem comprising:

3 differentially encoding the frame; and

4 differentially decoding the frame.

1 15. The method of Claim 14, wherein the differential
2 decoding is performed after a multiple modulus decoder.

1 16. The method of Claim 14, the frame is differentially
2 encoded before being supplied to a multiple modulus encoder.

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